Efficacy of Particulated Juvenile Cartilage Allograft Transplantation for Osteochondral Lesions of the Talus

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Disclosure

- No personal conflicts to disclose
- Full disclosures of co-authors in final AOFAS mobile App.
- We have no potential conflicts with this presentation.
OLTs are difficult to treat

- Revision operations have poor outcomes
- Multiple procedure options:
  - Cartilage repair
  - Cartilage replacement
  - Cartilage regeneration
Particulated Juvenile Cartilage Allograft Transplantation (PJCAT)

- Single vendor
  - DeNovo (Zimmer)
- Advantages
  - 10x chondrocyte density compared to adults
  - Theoretical replacement with Type II cartilage
  - Single stage procedure
  - Can be done arthroscopically

- Coetzee et. al. (FAI, 2013)- 78% success
- Park et. al. (FAS, 2016)- at 2 years, functional outcomes better than BMAC
Hypothesis

1. Minimal clinical data exists on the use of PJCAT
2. Evaluate both clinical and functional outcomes after the use of PJCAT
3. Identify patient and osteochondral lesion attributes that influence outcomes

Hypothesis: PJCAT is a safe and effective treatment in patients with osteochondral lesions of the talus
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**Methods**

- Consecutive patients treated with PJCAT between 2012 and 2015

- Minimum 1-year follow-up

- Retrospective chart review and phone questionnaire

- Patient demographic data
  - Age
  - Gender
  - BMI
  - History of prior osteochondral surgery

- Surgical variables
  - Technique (open versus arthroscopic)
  - Lesion size

<table>
<thead>
<tr>
<th>Table 1. Demographics</th>
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<tbody>
<tr>
<td><strong>Sex</strong></td>
</tr>
<tr>
<td>M= 7</td>
</tr>
<tr>
<td>F= 8</td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>32.7</td>
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<tr>
<td>(15-48)</td>
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<tr>
<td><strong>BMI</strong></td>
</tr>
<tr>
<td>29.9</td>
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<tr>
<td>(18.8-40.2)</td>
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<tr>
<td><strong>Average Follow up (Months)</strong></td>
</tr>
<tr>
<td>34.6</td>
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<tr>
<td>(12-51)</td>
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<tr>
<td><strong>MRI Lesion Size</strong></td>
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<tr>
<td>143.6mm²</td>
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<tr>
<td>(66-299mm²)</td>
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<tr>
<td><strong>Intraoperative Lesion Size</strong></td>
</tr>
<tr>
<td>128mm²</td>
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<tr>
<td>(77-200mm²)</td>
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<tr>
<td><strong>Etiology</strong></td>
</tr>
<tr>
<td>Traumatic</td>
</tr>
<tr>
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<tr>
<td><strong>Location</strong></td>
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<tr>
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<tr>
<td><strong>Technique</strong></td>
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<tr>
<td>Arthroscopic</td>
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<tr>
<td>12</td>
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<tr>
<td>Open</td>
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Methods

- **Success:**
  - Improvement in pain
  - No subsequent cartilage restoration procedure

- **Failure:**
  - Persistent or worsening pain
  - Subsequent cartilage restoration procedure

- **Statistics**
  - Calculated for all predictor variables
  - Univariate analysis with Fischer’s exact Tests
  - Paired t-tests to compare continuous variables
  - Significance set at a level of p < 0.05
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Success rate: 60%

Univariate analysis

Multivariate analysis

• Sex
• Location
• MRI Size

Results:

• Sex portends to increased rates of failure, increased risk of recurrence of pain, lower FAOS pain, ADL, sports, QoL and total scores
  • Trends towards significance for lower AOFAS hindfoot and FAOS symptoms scores
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Failure associated with:

- Male sex
  - $17\beta$-estradiol positively regulate type II collagen gene expression
- Lesions larger than $125\text{mm}^2$

Conclusions

- PJCAT is a viable option for a cartilage replacement strategy in refractory osteochondral lesions of the talus.
- Males may be at increased risk of failure when using PJCAT as a treatment strategy.
- We recommend the use of PJCAT in refractory lesions <125mm².

Study Limitations

- Retrospective
- Small cohort
- Pilot study for future research